

## CLAIMS

1. An amino acid wherein the sidechain of said amino  
acid is isotopically enriched with  $^2\text{H}$  and wherein the  
backbone of said amino acid is isotopically enriched with  
an isotope selected from the group consisting of  $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  
 $^2\text{H}$  and any combination thereof, with the proviso that  
said amino acid is not isotopically enriched with  $^2\text{H}$  at  
every hydrogen.

2. An amino acid of claim 1, wherein the backbone of  
said amino acid is isotopically enriched with an isotope  
selected from the group consisting of  $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  $^2\text{H}$  and any  
combination thereof.

3. An amino acid of claim 1, wherein the  $\alpha$ -carbon proton  
of said amino acid is isotopically enriched with  $^2\text{H}$ .

4. A method of synthesizing the amino acid of claim 1,  
which comprises:

(a) obtaining glycine that optionally is  
isotopically enriched in the backbone with an isotope  
selected from the group consisting of  $^{13}\text{C}$ ,  $^{15}\text{N}$  and  $^2\text{H}$  or  
any combination thereof;

(b) chemically derivatizing said glycine;

(c) adding a deuterated side chain to said  
chemically derivatized glycine in a stereo-selective  
manner to produce a protected sidechain deuterated amino  
acid; and

(d) deprotecting said sidechain deuterated amino  
acid.

5. A method of synthesizing the amino acid of claim 2, which comprises:

(a) obtaining glycine that optionally is isotopically enriched in the backbone with an isotope selected from the group consisting of  $^{13}\text{C}$ ,  $^{15}\text{N}$  and  $^2\text{H}$  or any combination thereof;

(b) chemically derivatizing said glycine;

(c) adding a deuterated side chain to said chemically derivatized glycine in a stereo-selective manner to produce a protected sidechain deuterated amino acid;

(d) deuterating the  $\alpha$ -carbon of said protected sidechain deuterated amino acid; and

(e) deprotecting said sidechain deuterated amino acid.

6. A peptidic molecule which comprises at least one amino acid of claim 1.

7. A peptide molecule which comprises at least one amino acid of claim 2.

8. A peptide molecule which comprises at least one amino acid of claim 3.

9. A peptide molecule which comprises at least one species of amino acid wherein the side chain of each occurrence of said species of amino acid is isotopically enriched with  $^2\text{H}$ .

10. A peptide molecule of claim 9, wherein the backbone of each occurrence of said species of amino acid is isotopically enriched with an isotope selected from the

group consisting of  $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  $^2\text{H}$  and any combination thereof.

11. A peptide molecule of claim 9, wherein the  $\alpha$ -carbon proton of each occurrence of said species of amino acid is isotopically enriched with  $^2\text{H}$ .

12. A medium capable of supporting the growth of cells in culture which comprises at least one amino acid of claim 1.

13. A medium capable of supporting the growth of cells in culture which comprises at least one amino acid of claim 2.

14. A medium capable of supporting the growth of cells in culture which comprises at least one amino acid of claim 3.

15. A method of producing an isotopically labeled peptide molecule, which comprises:

(a) providing a medium of claim 12;

(b) providing a cell culture that expresses said peptide molecule;

(c) growing said cell culture in said medium under protein-producing conditions such that said cell expresses said peptide molecule in isotopically labeled form; and

(d) isolating said isotopically labeled peptide molecule from said medium.

16. A method of producing on isotopically labeled peptide molecule, which comprises:

(a) providing a medium of claim 13;

(b) providing a cell culture that expresses said peptide molecule;

(c) growing said cell culture in said medium under protein-producing conditions such that said cell expresses said peptide molecule in isotopically labeled form; and

(d) isolating said isotopically labeled peptide molecule from said medium.

17. A method of producing on isotopically labeled peptide molecule, which comprises:

(a) providing a medium of claim 14;

(b) providing a cell culture that expresses said peptide molecule;

(c) growing said cell culture in said medium under protein-producing conditions such that said cell expresses said peptide molecule in isotopically labeled form; and

(d) isolating said isotopically labeled peptide molecule from said medium.

18. A method of determining structural information for a peptidic molecule, which comprises:

(a) producing said peptidic molecule according to the method of claim 15; and

(b) subjecting said peptidic molecule to nuclear magnetic resonance.

19. A method of determining structural information for a peptidic molecule, which comprises:

(a) producing said peptidic molecule according to the method of claim 16; and

(b) subjecting said peptidic molecule to nuclear magnetic resonance.

20. A method of determining structural information for a peptidic molecule, which comprises:

(a) producing said peptidic molecule according to the method of claim 17; and

(b) subjecting said peptidic molecule to nuclear magnetic resonance.